§ 56.70–20 Qualification, general.

(a) Qualification of the welding procedures to be used, and of the performance of welders and welding operators, is required, and shall comply with the requirements of section IX of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 56.01–2) except as modified by part 57 of this subchapter.

(b) Each butt-welded joint of Class I of Class I-L piping shall be marked with the welder's identification symbol. Dies shall not be used to mark the pipe where the pressure exceeds 600 pounds per square inch or the temperature exceeds 750 °F. or in Class I-L systems.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65184, Oct. 31, 2008]

Subpart 56.75—Brazing

§ 56.75–5 Filler metal.

(a) The filler metal used in brazing must be a nonferrous metal or alloy having a melting point above 1,000 °F. and below that of the metal being joined. The filler metal must meet and flow freely within the desired temperature range and, in conjunction with a suitable flux or controlled atmosphere, must wet and adhere to the surfaces to be joined. Prior to using a particular brazing material in a piping system, the requirements of § 56.60–20 of this part should be considered.

(b) The brazing material used shall have a shearing strength of at least 10,000 pounds per square inch. The maximum allowable working pressure for brazing piping shall be determined by this part.

(c) Fluxes that are fluid and chemically active at the brazing temperature must be used when necessary to prevent oxidation of the filler metal and of the surfaces to be joined and to promote free flowing of the filler metal.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGD 77–140, 54 FR 40615, Oct. 2, 1989; USCG–2003–16630, 73 FR 65184, Oct. 31, 2008]

§ 56.75–10 Joint clearance.

(a) The clearance between surfaces to be joined shall be no larger than is necessary to insure complete capillary distribution of the filler metal; between 0.002–inch minimum and 0.006-inch maximum.

(b) [Reserved]

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65184, Oct. 31, 2008]

§ 56.75–15 Heating

(a) The joint shall be brought to brazing temperature in as short a time as possible to minimize oxidation.

(b) [Reserved]

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65184, Oct. 31, 2008]

§ 56.75–20 Brazing qualification.

(a) The qualification of the performance of brazers and brazing operators shall be in accordance with the requirements of part C, Section IX of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 56.01–2) and part 57 of this subchapter.

(b) Manufacturers shall perform those tests required by paragraph (a) of this section prior to performing production brazing.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65184, Oct. 31, 2008]

§ 56.75–25 Detail requirements.

(a) Pipe may be fabricated by brazing when the temperature to which such connections may be subjected does not exceed 425 °F. (For exception refer to § 56.30–30(b)(1).)

(b) The surfaces to be brazed must be clean and free from grease, oxides, paint, scale, and dirt of any kind. Any suitable chemical or mechanical cleaning method may be used to provide a clean, wettable surface for brazing.

(c) After the parts to be joined have been thoroughly cleaned the edges to be brazed shall be given an even coating of flux prior to heating the joint as a protection against oxidation.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65184, Oct. 31, 2008]

§ 56.75–30 Pipe joining details.

(a) *Silver brazing.* (1) Circumferential pipe joints may be either of the socket

or butt type. When butt joints are employed the edges to be joined shall be cut or machined square and the edges shall be held closely together to insure a satisfactory joint.

(b) *Copper-alloy brazing.* (1) Copper-alloy brazing may be employed to join pipe, valves, and fittings. Circumferential joints may be either of the butt or socket type. Where butt joints are employed, the included angle shall be not less than 90° where the wall thickness is three-sixteenths of an inch or greater. The annular clearance of socket joints shall be held to small clearances which experience indicates is satisfactory for the brazing alloy to be employed, method of heating, and material to be joined. The annular clearance shall be shown on drawings submitted for approval of socket joints.

(2) Copper pipe fabricated with longitudinal joints for pressures not exceeding that permitted by the regulations in this subchapter may have butt, lapped, or scarfed joints. If of the latter type, the kerf of the material shall be not less than 60°.

(c) *Brazing, general.* (1) Heat shall be applied evenly and uniformly to all parts of the joint in order to prevent local overheating.

(2) The members to be joined shall be held firmly in place until the brazing alloy has set so as to prevent any strain on the joint until the brazing alloy has thoroughly solidified. The brazing shall be done by placing the flux and brazing material on one side of the joint and applying heat until the brazing material flows entirely through the lap and shows uniformly along the seam on the other side of the joint. Sufficient flux shall be used to cause the brazing material to appear promptly after reaching the brazing temperature.

Subpart 56.80—Bending and Forming

§ 56.80–5 Bending.

Pipe may be bent by any hot or cold method and to any radius which will result in a bend surface free of cracks, as determined by a method of inspection specified in the design, and substantially free of buckles. Such bends shall meet the design requirements of 102.4.5 and 104.2.1 of ASME B31.1 (incorporated by reference; see 46 CFR 56.01–2). This shall not prohibit the use of bends designed as creased or corrugated. If doubt exists as to the wall thickness being adequate, Class I piping having diameters exceeding 4 inches shall be nondestructively examined by the use of ultrasonics or other acceptable method. Alternatively, the pipe may be drilled, gaged, and fitted with a screwed plug extending outside the pipe covering. The nondestructive method shall be employed where the design temperature exceeds 750 °F. Prior to the use of nondestructive method of examination by the above procedure, it shall be demonstrated by the user, in the presence of a marine inspector on specimens similar to those to be examined, that consistent results, having an accuracy of plus or minus 3 percent, can be obtained.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9979, June 17, 1970; USCG–2003–16630, 73 FR 65185, Oct. 31, 2008]

§ 56.80–10 Forming (reproduces 129.2).

(a) Piping components may be formed (swaging, lapping, or upsetting of pipe ends, extrusion of necks, etc.) by any suitable hot or cold working method, providing such processes result in formed surfaces which are uniform and free of cracks or other defects, as determined by methods of inspection specified in the design.

§ 56.80–15 Heat treatment of bends and formed components.

(a) Carbon-steel piping that has been heated to at least 1,650 °F (898 °C) for bending or other forming requires no subsequent heat treatment.

(b) Ferritic alloy steel piping which has been heated for bending or other forming operations shall receive a stress relieving treatment, a full anneal, or a normalize and temper treatment, as specified by the design specification before welding.

(c) Cold bending and forming of carbon steel having a wall thickness of three-fourths of an inch and heavier, and all ferritic-alloy pipe in nominal pipe sizes of 4 inches and larger, or one-half-inch wall thickness or heavier,